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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/616,842	07/10/2003	Lipeng Cao	SC12795TS	1718

23125 7590 01/16/2007	EXAMINER
FREESCALE SEMICONDUCTOR, INC.	OCHOA, JUAN CARLOS
LAW DEPARTMENT	

	ART UNIT	PAPER NUMBER
7700 WEST PARMER LANE MD:TX32/PL02 AUSTIN, TX 78729	2123	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

	Application No.	Applicant(s)
Office Action Summary	10/616,842	CAO, LIPENG
	Examiner	Art Unit	
	Juan C. Ochoa	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>*10 July 2003*</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>*1-33*</u> is/are pending in the application.

    4a) Of the above claim(s) <u>*16-30*</u> is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>*1-15*</u> is/are rejected.

7)☒ Claim(s) <u>*31-33*</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>*10 July 2003*</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>*7/10/03*</u>.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____ .

DETAILED ACTION

1.   Claims 1–33 are pending in this application, claims 1–15 and 31–33 have been

elected without traverse, claims 16–30 have been withdrawn as being directed to the

non–elected invention.

Election/Restrictions

2.   Restriction to one of the following inventions is required under 35 U.S.C. 121:

   I.   Claims 1–15 and 31–33, drawn to method of deriving a power transfer

           function of a circuit, classified in class 703, subclass 18.

   II.   Claims 16–30, drawn to an apparatus comprising circuits, classified in

           class 375, subclass 224.

3.   The inventions are distinct, each from the other because of the following reasons:

4.   Inventions I and II are related as process and apparatus for its practice. The

inventions are distinct if it can be shown that either: (1) the process as claimed can be

practiced by another and materially different apparatus or by hand, or (2) the apparatus

as claimed can be used to practice another and materially different process. (MPEP §

806.05(e)). In this case a device other than the apparatus can derive a power transfer

function. Also the apparatus claimed could provide power monitoring for a variety of

applications.

5.   Because these inventions are independent or distinct for the reasons given

above and have acquired a separate status in the art in view of their different

classification, restriction for examination purposes as indicated is proper.

6.   Because these inventions are independent or distinct for the reasons given

above and the inventions require a different field of search (see MPEP § 808.02),

restriction for examination purposes as indicated is proper.

7.   During a telephone conversation with David G. Dolezal on 12/4/06 a provisional

election was made without traverse to prosecute the invention of Invention I, claims 1–

15 and 31–33. Affirmation of this election must be made by applicant in replying to this

Office action. Claims 16–30 are withdrawn from further consideration by the examiner,

37 CFR 1.142(b), as being drawn to a non-elected invention.

Specification

8.   The disclosure is objected to because page 5, lines 9 and 10 contain application

cross–references in need of updated information. Applicant is required to update such

information.

9.   The disclosure is objected to because of the following informalities:

10.   Page 2, line 2, includes the misspelled term "coherences", should be

"coherencies".

11.   Page 7, line 16, includes the misspelled term "coherences", should be

"coherencies".

12.   Appropriate correction is required.

Claim Objections

13.   Claims 31–33 are objected to because of the following informalities:

14.   Claim 31 lines 5–6 include "wherein each power impulse response of the at least

one power impulse response representative of at least one input of the plurality of

inputs", meaning is unclear. Examiner interprets as " wherein each power impulse

response of the at least one power impulse response is representative of at least one

input of the plurality of inputs" for examination purposes.

Claim Rejections - 35 USC § 112

15.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

16.   Claim 5 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with

the enablement requirement. The claim(s) contains subject matter, which was not

described in the specification in such a way as to enable one skilled in the art to which it

pertains, or with which it is most nearly connected, to make and/or use the invention.

Examiner does not see the subject matter description of "clustering in multi-dimensional

space having a dimension for each test" in the specification.

17.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

18.   Claims 7–9 are rejected under 35 U.S.C. 112, second paragraph, as being

incomplete for omitting essential elements, such omission amounting to a gap between

the elements. See MPEP § 2172.01.

19.   As to claim 7, The omitted elements are: a connection between claim 1's

"grouping the plurality of inputs into groups of at least one input" and "transfer function

includes a portion for each group of the groups" and claim 7's "a method wherein each

portion implements a model". As per claim 1, groups are composed of a plurality of

inputs and a transfer function includes a portion for each group. Claim 7 calls for each

portion implementing a model. Examiner confused as how to interpret "a model for a

group of signals" in relation to the rest of the claimed invention for examination

purposes.

20.   Dependent claims inherit the defect of the claim from which they depend.

Claim Rejections - 35 USC § 103

21.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

22.   The factual inquiries set forth in Graham v. John Deere Co., 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

     1.   Determining the scope and contents of the prior art.

     2.   Ascertaining the differences between the prior art and the claims at issue.

     3.   Resolving the level of ordinary skill in the pertinent art.

     4.   Considering objective evidence present in the application indicating obviousness or nonobviousness.

23.   Claims 1–3, 12, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uchino, (Uchino hereinafter), U.S. Patent 7,076,405, taken in view of Macii et al., (Macii hereinafter), Stream Synthesis For Efficient Power Simulation Based On Spectral Transforms.

24.   As to claim 1, Uchino discloses a method of deriving a power transfer function (see col. 3, lines 38–41) of a circuit, the method comprising: grouping the plurality of inputs into groups of at least one input (see col. 10, lines 44–50); and providing an estimate of power consumption of the circuit responsive to signals applied to the plurality of inputs of the circuit, wherein the transfer function includes a portion for each group of the groups (see col. 3, line 65 to col. 4, line 17).

25.   While Uchino discloses grouping the plurality of inputs into groups of at least one input and providing an estimate of power consumption of the circuit responsive to signals applied to the plurality of inputs of the circuit, wherein the transfer function includes a portion for each group of the groups; Uchino fails to disclose running at least one test on a circuit having a plurality of inputs to obtain information on power consumption of the circuit responsive to signals applied to the plurality of inputs, grouping the plurality of inputs into groups of at least one input based on a commonality of power consumption of the circuit for the plurality of inputs as determined from the information and deriving a power transfer function.

26.   Macii discloses running at least one test on a circuit having a plurality of inputs to

obtain information on power consumption of the circuit responsive to signals applied to

the plurality of inputs (see page 417, col. 2, next to last paragraph, lines 3–6); grouping

the plurality of inputs into groups of at least one input based on a commonality of power

consumption of the circuit for the plurality of inputs as determined from the information

(see page 417, col. 2, next to last paragraph, lines 1–3 and 7–10); deriving a power

transfer function (see "power transfer function" as "input switching function" in page 419,

col. 1, 3rd paragraph, lines 3–6).

27.   Uchino and Macii are analogous art because they are both related to estimating

power consumption.

28.   Therefore, it would have been obvious to one of ordinary skill in this art at the

time of invention by applicant to utilize the steps of Macii in the method of Uchino

because Macii minimizes the time required to perform simulation-based power

estimation by reducing the length of the input trace to be fed to the simulator (see page

417, col. 1, lines 1–3), and as a result, Macii reports the following improvements over

his prior art: synthesizing short streams of patterns that can be used for power

simulation instead of the long input traces usually determined by the designers through

architectural, behavioral, or system-level simulation. His method uses spectral

information (in addition to the usual correlation measures) collected on the given

sequence to properly form a reduced stream which guarantees a large speed-up in the

simulation time at the price of a very low average power estimation error, and thus

generates reduced streams for a large variety of original input traces (see page 426,

col. 1, Conclusion).

29.   As to claim 2, Macii discloses a method wherein the grouping comprises: deriving

at least one coherency for each input of the plurality with respect to power consumption

based on the information (see page 420, col. 2, paragraphs 2 and 3) and clustering the

coherencies to identify the groups (see page 420, col. 2, last paragraph, lines 1–7).

30.   As to claim 3, deriving at least one coherency further includes: deriving, for each

input of the plurality and for each test of the at least one test an average squared

coherency (manipulation of mathematical concepts) wherein the clustering the

coherencies further includes clustering the average squared coherencies (manipulation

of mathematical concepts).

31.   As to claim 12, Macii discloses a method further comprising: simulating the circuit

(see page 422, col. 1, next to last paragraph, lines 3–5); wherein the running at least

one test on the circuit includes running the at least one test on the simulated circuit (see

page 422, col. 2, 2nd paragraph).

32.   As to claim 14, Macii discloses a method wherein the deriving includes

performing frequency domain analysis of the information (see page 417, col. 1, 2nd

paragraph).

33.   As to claim 15, Macii discloses a method wherein the grouping includes

performing frequency domain analysis of the information (see page 417, col. 1, 2nd

paragraph).

34.   Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uchino

taken in view of Macii as applied to claim 2 above, and further in view of Welch, (Welch

hereinafter), The Use Of Fast Fourier Transform For The Estimation Of Power Spectra:

A Method Based On Time Averaging Over Short, Modified Periodograms.

35.   As to claim 4, Macii discloses a method wherein the deriving at least one

coherency further includes: taking a Fourier transform applied of each signal applied to

each input of the plurality for each test of the at least one test (see page 419, col. 1, last

paragraph, lines 9–13). A coherency of the at least one coherency for each test is

derived from the Fourier transform of the signal applied to the input for that test and the

Fourier transform of the power consumed for that test (manipulation of mathematical

concepts).

36.   While the Uchino–Macii method takes a Fourier transform applied of each signal

applied to each input of the plurality for each test of the at least one test; the Uchino–

Macii method lacks deriving at least one coherency further including: taking a Fourier

transform applied of each signal applied to each input of the plurality for each test of the

at least one test.

37.   Welch discloses taking a Fourier transform of the power consumed for each test

of the at least one test (see page 70, col. 2, lines 8–9).

38.   Uchino, Macii, and Welch are analogous art because they are related to

estimating power consumption.

39.   Therefore, it would have been obvious to one of ordinary skill in this art at the

time of invention by applicant to utilize the steps of Welch in the Uchino–Macii method

because Welch outlines a method for the application of the fast Fourier transform

algorithm to the estimation of power spectra, which involves sectioning the record,

taking modified periodograms of these sections, and averaging these modified

periodograms (see page 70, col. 1, Introduction, lines 1–6), and as a result, Welch

reports the following improvements over his prior art: fewer computations than other

methods, transformation of sequences which are shorter than the whole record, and a

potential resolution in the time dimension (see page 70, col. 1, Introduction, lines 6–12).

40.   Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uchino

taken in view of Macii as applied to claim 1 above, and further in view of Joseph et al.,

(Joseph hereinafter), Run-Time Power Estimation in High Performance Microprocessors

(See IDS dated 7/10/03).

41.   As to claim 10, While the Uchino–Macii method derives a power transfer function

of a circuit; the Uchino–Macii method lacks implementing the power transfer function in

a second circuit wherein the second circuit includes inputs coupled to the inputs of the

circuit.

42.   Joseph discloses a method further comprising: implementing the power transfer

function in a second circuit wherein the second circuit includes inputs coupled to the

inputs of the circuit (see "run-time monitor" in page 135, col. 2, last paragraph, lines 1–

3).

43.   Uchino, Macii, and Joseph are analogous art because they are related to

estimating power consumption.

44.   Therefore, it would have been obvious to one of ordinary skill in this art at the
time of invention by applicant to utilize the steps of Joseph in the Uchino–Macii method
because Joseph examines the use of hardware performance counters as proxies for
power meters, discusses which performance counters count power-relevant events,
estimates event counts for power-relevant events not well supported by his prior art
(see page 135, col. 1, 2nd paragraph, lines 4–9), and as a result, Joseph reports the
following improvements over his prior art: instead of relying on simplified performance
simulations, programmers can evaluate the impact of their final optimizations on real
hardware (see page 136, col. 1, , lines 8–12) and applications in high performance
processors which exhibit complex energy usage patterns providing component power
consumption (see page 140, col. 1, , 2nd paragraph, lines 4–5).

Allowable Subject Matter

45.   Claims 5 and 7–9 would be allowable if rewritten to overcome the rejection(s)
under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of
the limitations of the base claim and any intervening claims.

46.   Any indication of allowability of the claims not rejected on prior art is being held in
abeyance pending the manner in which applicant amends or responds to the above
rejections.

47.   Claims 6, 11, and 13 are objected to as being dependent upon a rejected base
claim, but would be allowable if rewritten in independent form including all of the
limitations of the base claim and any intervening claims.

48.   Claims 31–33 are objected to for informalities but would be allowable if rewritten

correcting the deficiencies.

49.   The following is a statement of reasons for the indication of allowable subject

matter:

50.   While Uchino discloses a method of deriving a power transfer function (see col.

3, lines 38–41) of a circuit,

Macii minimizes the time required to perform simulation-based power estimation by

reducing the length of the input trace to be fed to the simulator (see page 417, col. 1,

lines 1–3),

Welch outlines a method for the application of the fast Fourier transform algorithm to the

estimation of power spectra, which involves sectioning the record, taking modified

periodograms of these sections, and averaging these modified periodograms (see page

70, col. 1, Introduction, lines 1–6),

and Joseph discloses deducing the actual runtime power dissipated by different

processor units on a CPU chip (see page 135, col. 1, 2nd paragraph, lines 1–4),

none of these references taken either alone or in combination disclose the following

limitations specifically including:

claim 6 "determining an accuracy of the transfer function and changing the coefficients

to improve the accuracy of the power transfer function",

claims 11 and 13 "deriving a second power transfer function for providing an estimate of

power consumption of the second circuit responsive to signals applied to the plurality of

inputs of the second circuit, wherein the second power transfer function includes a

portion for each group of the groups of the second circuit",

and claim 31 "deriving at least one power impulse function from the information",

in combination with the remaining elements and features of the claimed invention. Also,

there is no motivation to combine none of the references to meet these limitations. It is

for these reasons that applicant's invention defines over the prior art of record.

51.   As allowable subject matter has been indicated, applicant's reply must either

comply with all formal requirements or specifically traverse each requirement not

complied with. See 37 CFR 1.111(b) and MPEP § 707.07(a).

Conclusion

52.   Examiner would like to point out that any reference to specific figures, columns

and lines should not be considered limiting in any way, the entire reference is

considered to provide disclosure relating to the claimed invention.

53.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Juan C. Ochoa whose telephone number is (571) 272-

2625. The examiner can normally be reached on 7:30AM - 4:00 PM.

54.   If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Paul Rodriguez can be reached on (571) 272-3753. The fax phone number

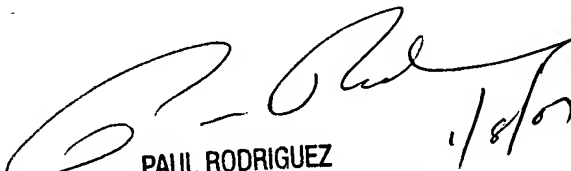for the organization where this application or proceeding is assigned is 571-273-8300.

55.   Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

*** 1/7/07

PAUL RODRIGUEZ
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100